

Law

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In re the Application of

Inventors: Mutsuhiko Ooishi Art Unit 2838  
Appln No.: 10/615,855 Examiner M. V. Nguyen  
Filed: July 9, 2003  
For: AC ADAPTER INTEGRAL-TYPE HOUSEHOLD-POWER-LINE  
COUPLER

SUBMISSION OF ENGLISH TRANSLATION OF  
FOREIGN PRIORITY APPLICATION

Assistant Commissioner of Patents  
Washington, DC 20231

Sir:

Enclosed is an English translation of the present Japanese  
priority application JP 2002-200961 filed July 10, 2002, and a  
Declaration regarding accurate translation.

Respectfully submitted,

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Date: May 11, 2005

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Attorney Docket No. L8612.04117

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PATENT OFFICE  
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the following application as filed with this office.

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Applicant(s): Matsushita Electric Industry Co., Ltd.

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[Article]              Specification                      1 copy

[Article]              Drawings                              1 copy

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[Designation of Document]            Specification

[Title of the Invention] AC ADAPTOR INTEGRAL-TYPE  
HOUSEHOLD-POWER-LINE COUPLER

[Scope of Claims]

[Claim 1] An AC adaptor integral-type household-power-line coupler comprising: a household-power-line power converting/supplying unit which is connected to a plug unit employed to be coupled to a household-power-line plug socket, and which is supplying electric power to a communication terminal; a household-power-line carrier signal coupling unit for inputting/outputting a signal via said plug unit to said communication terminal; and a casing unit containing thereinto both said household-power-line power converting/supplying unit and said household-power-line carrier signal coupling unit.

[Claim 2] An AC adaptor integral-type household-power-line coupler according to claim 1, wherein a filter unit for removing noise is connected between said plug unit and said household-power-line power converting/supplying unit.

[Claim 3] An AC adaptor integral-type household-power-line coupler according to claim 1 or 2, further comprising a signal synthesizing/separating unit for superimposing/separating a high frequency signal outputted from said household-power-line carrier signal coupling unit to a DC voltage outputted from said household-power-line power converting/supplying unit.

[Claim 4] An AC adaptor integral-type household-power-line coupler according to any one of claim 1 to claim 3, wherein said household-power-line carrier signal coupling unit is further comprised of a household-power-line modem for executing both a modulating operation and a demodulating operation; and said household-power-line modem is driven by electric power supplied from said household-power-line power converting/supplying unit.

[Disclosure of the invention]

[0001]

[Technical Field]

Recently, strong needs for constructing local area networks (LANs) in simple manners and in low cost have been made in small-scaled offices and homes. The present invention is related to an AC adaptor integral-type household-power-line coupler applied to a household-power-line communication apparatus, capable of simply constructing a local area network (LAN) in low cost.

[0002]

[Background Art]

Conventionally, in order to constitute local area networks, methods for installing leased communication lines have been conducted. On the other hand, there is another trend that wireless communication and household power lines (electric light lines) are employed without using the leased communication lines in order to establish local area networks. Then, this trend is gradually increased. In household-power-line communications,

household-power-line converting/supplying units (AC adaptors etc.) for supplying electric power to communication appliances capable of performing communications, and also, household-power-line carrier signal coupling units (household-power-line couplers) for transmitting/receiving communication signals to/from household power lines must be prepared respectively.

[0003]

A conventional household-power-line communication appliance will now be explained. Fig. 1 is a structural diagram of this conventional household-power-line communication appliance. A communication terminal 1 is connected to an AC adaptor 2 and a household-power-line modem 5, and a household-power-line coupler 3. In the case that a household-power-line communication is carried out, the AC adaptor 2, the household-power-line modem 5, and the household-power-line coupler 3 are connected to the communication terminal 1 so as to be used.

[0004]

[Problems that the Invention is to Solve]

However, the above-explained conventional method and LAN constructing method owe the following problems:

[0005]

(1) To perform a household-power-line communication by the communication terminal 1, the AC adaptor 2, the household-power-line modem 5, and the household-power-line coupler 3 must be separately connected to the communication terminal 1. Accordingly, the cumbersome connecting operations

are necessarily required. Thus, there is such a problem that handling characteristics and operability are deteriorated in the case that the communication terminal 1 is moved.

[0006]

(2) At least two sets of household-power-line plug units are required which are occupied by these units, so that wiring lines are made complicated. Therefore, there are problems that outer appearances are deteriorated and designing senses are also deteriorated.

[0007]

The present invention has been made to solve the above-explained problems, and therefore, has an object to provide such a compact AC adaptor integral-type household-power-line coupler capable of simplifying a structural arrangement of an apparatus containing a communication terminal, and also capable of improving a handling characteristic and an outer appearance thereof.

[0008]

[Means for Solving the Problems]

To solve the above-described problems, an AC adaptor integral-type household-power-line coupler, according to the present invention, is featured by comprising: a household-power-line power converting/supplying unit connected to a plug unit, for supplying electric power to a communication terminal, the plug unit being employed to be coupled to a household-power-line plug socket; a household-power-line carrier signal coupling unit for inputting/outputting a signal via the



plug unit to the communication terminal; and a casing unit containing thereinto both the household-power-line power converting/supplying unit and the household-power-line carrier signal coupling unit. As a consequence, the structural arrangement of the apparatus containing the communication terminal can be made simpler and compact, resulting in improvements of handling characteristics and superior appearances.

[0009]

[Best Mode for Carrying Out the Invention]

An AC adaptor integral-type household-power-line coupler described in claim 1 comprises: a household-power-line power converting/supplying unit which is connected to a plug unit employed to be coupled to a household-power-line plug socket, and which is supplying electric power to a communication terminal; a household-power-line carrier signal coupling unit for inputting/outputting a signal via said plug unit to said communication terminal; and a casing unit containing thereinto both said household-power-line power converting/supplying unit and said household-power-line carrier signal coupling unit.

[0010]

By this construction, this invention may have the following effects.

[0011]

(a) Since both of the household-power-line power converting/supplying unit and the household-power-line carrier signal coupling unit are contained in the casing unit, it is possible to collectively handle the both. Thus, it has good handling

characteristics.

[0012]

(b) Since the structural arrangement of the peripheral equipment around the communication terminal can be made simpler and compact, resulting in improvements of superior appearances and design characteristics.

[0013]

(C) Since only one set of household-power-line plug socket to be connected is merely required, the communication apparatus can be set in a very easy manner, and the superior maintenance characteristic such as inspections and cleaning of the periphery as to the plug socket can be realized.

[0014]

Here, the household-power-line power converting/supplying unit is an electric power section which directly converts the alternating voltage supplied from the household-power-line plug socket via the plug unit, to the direct current of the predetermined voltage, and which comprises converter or battery charge for charging to the battery charge.

[0015]

The household-power-line carrier signal coupling unit has the function to send and receive signals which are carried via the household-power-line, to the household-power-line.

[0016]

The casing unit is a container made of metal such as aluminum and steel or plastic such as polyethylene and polycarbonate, both of the household-power-line power converting/supplying unit

and the household-power-line carrier signal coupling unit are integrally contained in the casing unit, the casing unit comprises terminal unit or cable unit connected to the external communication terminal.

[0017]

The AC adaptor integral-type household-power-line coupler described in claim 2 is an AC adaptor integral-type household-power-line coupler according to claim 1, wherein a filter unit for removing noise is connected between said plug unit and said household-power-line power converting/supplying unit.

[0018]

By this construction, in addition to the effect of claim 1, this invention may have the following effects.

[0019]

(a) By adding filter unit, it is possible to prevent the noise occurred by the household-power-line power converting/supplying unit from affecting to said household-power-line communication signal, it is possible to carry out to high-speed communication.

[0020]

(b) Since it is possible to prevent high frequency signal using for the household-power-line communication from feeding into the household-power-line power converting/supplying unit, it is possible to keep the signal-to-noise rate high, it is possible to carry out to high-speed communication.

[0021]

Here, the filtering unit is a circuit unit constituted of for example choke coil, having a filtering characteristic that alternating current of low frequencies can be passed, but high frequency signal may become a high impedance with respect to signals used for household-power-line communications and can not be passed. Also, this filtering characteristic is capable of not leaking high-frequency noise produced from into the household-power-line power converting/supplying unit into outside.

[0022]

An AC adaptor integral-type household-power-line coupler described in claim 3 is an AC adaptor integral-type household-power-line coupler according to claim 1 or 2, further comprising a signal synthesizing/separating unit for superimposing/separating a high frequency signal outputted from said household-power-line carrier signal coupling unit to a DC voltage outputted from said household-power-line power converting/supplying unit.

[0023]

By this construction, in addition to the effect of claim 1 or 2, this invention may have the following effects.

[0024]

In addition to the household-power-line power converting/supplying unit and the household-power-line carrier signal coupling unit, a signal synthesizing/separating unit for superimposing/separating a high frequency signal outputted from said household-power-line carrier signal coupling unit is

integrally hold inside the identical casing, accordingly this invention has effects that the number of cable connected between the household-power-line coupler and the communication terminal can be reduced.

[0025]

Here, the signal synthesizing/separating unit is constituted of a circuit unit or inductance comprising such as choke coil. The filtering characteristic that low frequency signal such as the household-power-line source can be passed, but high frequency signal such as the household-power-line communication signal may become a high impedance with respect to signals used for household-power-line communications and can not be passed, is used.

[0026]

An AC adaptor integral-type household-power-line coupler described in claim 4 is an AC adaptor integral-type household-power-line coupler according to any one of claim 1 to claim 3, wherein said household-power-line carrier signal coupling unit is further comprised of a household-power-line modem for executing both a modulating operation and a demodulating operation; and said household-power-line modem is driven by electric power supplied from said household-power-line power converting/supplying unit.

[0027]

By this construction, in addition to the effect of any one of claim 1 to 3, this invention may have the following effects.

[0028]

(a) Since the household-power-line modem is equipped into the casing unit, there is such an effect that a total number of the electronic appliances required to perform the household-power-line communications can be further reduced.

[0029]

(b) Since the household-power-line coupler and the like may be operated by the electric power supplied from the power producing unit 7 built in the casing unit, the circuit arrangement can be made simple, and the AC adaptor integral-type household-power-line coupler can be operated in a higher efficiency.

[0030]

(c) It is possible to simplify circuits to be installed in the communication terminal.

[0031]

Referring now to drawings, various embodiment of the present invention will be described.

[0032]

[FIRST EMBODIMENT]

Fig. 2 is a structural diagram of a household-power-line communication appliance to which an AC adaptor integral-type household-power-line coupler according to a first embodiment of the preset invention is applied.

[0033]

In Fig. 2, reference numeral 1 shows a communication terminal which processes signals transmitted via a household power line,

reference numeral 5 indicates a household-power-line modem, reference numeral 6 represents a casing unit of an AC adaptor integral-type household-power-line coupler, and reference numeral 4 shows a plug unit of the AC adaptor integral-type household-power-line coupler, which is connected to a plug socket of the household power line.

[0034]

Fig. 3 is a block diagram for schematically indicating the AC adaptor integral-type household-power-line coupler of the first embodiment of the present invention. In Fig. 3, reference numeral 6 indicates the casing unit that contains the below-mentioned units in an integral form. Reference numeral 7 shows the household-power-line power converting/supplying unit (namely, power producing unit) connected to the plug unit 4. Reference numeral 8 indicates a household-power-line coupler that is connected in parallel to the power producing unit 7.

[0035]

A description will now be made of operations with respect to the AC adaptor integral-type-household-power-line coupler with employment of the above-described arrangement, according to the first embodiment. While the plug unit 4 is connected to a household-power-line plug socket, this AC adaptor integral-type household-power-line coupler is arranged in such a manner that commercial AC power used to drive the communication terminal 1 is obtained by the power producing unit 7, and at the same time, signals for a household-power-line communication purpose are transmitted/received by the household-power-line

coupler 8.

[0036]

In other words, the power producing unit 7 connected to the plug unit 4 produces electric power required in the communication terminal 1 from the commercial AC power supply, and then, supplies the produced electric power to the communication terminal 1. Also, the household-power-line coupler 8 which is similarly connected to the plug unit 4 is connected to the household-power-line modem 5 used for the household-power-line communication purpose.

[0037]

As a consequence, the household-power-line coupler 8 extracts signals for the household-power-line communication purpose from the plug unit 4, and then, supplies these extracted signals to the household-power-line modem 5. The household-power-line coupler 8 superimposes the signals received from the household-power-line modem 5 on the household power line in the transmission mode.

[0038]

Since the AC adaptor integral-type household-power-line coupler of the first embodiment is arranged in the above-described manner, this coupler may have the following effects.

[0039]

(a) Since the power producing unit 7 and the household-power-line coupler 8 are built in the casing unit 6, the wiring lines provided in the vicinity of the communication terminal 1 can be made simpler, resulting in improvements of



handling and better appearances.

[0040]

(b) Since the household-power-line coupler 8 is assembled in the casing unit 6, there is such an effect that a total number of electronic appliances that are required when the household-power-line communication is carried out can be reduced.

[0041]

(c) Since only one set of household-power-line plug socket to be connected to this AC adaptor integral-type household-power-line coupler is merely required, the communication apparatus can be set in a very easy manner, and the superior maintenance characteristic such as inspections and cleaning of peripheral units as to the plug socket can be realized.

[0042]

(d) Since the household-power-line coupler 8 may also be operated by the electric power supplied from the power producing unit 7 built in the casing unit 6, the AC adaptor integral-type household-power-line coupler can be operated in a higher efficiency.

[0043]

(SECOND EMBODIMENT)

Fig. 4 is a block diagram for schematically indicating the AC adaptor integral-type household-power-line coupler of a second embodiment of the present invention. In Fig. 4, Reference numeral 9 represents a filter unit which is connected/arranged between the power producing unit 7 and the plug unit 4 connected to a household-power-line plug socket.

[0044]

It should be noted that the AC adaptor integral-type household-power-line coupler according to the second embodiment owns such a different technical point that the above-described filter unit 9 is added to the AC adaptor integral-type household-power-line coupler according to the first embodiment.

[0045]

Operations of the AC adaptor integral-type household-power-line coupler with employment of the above-described arrangement, according to the second embodiment, will now be explained.

[0046]

While the plug unit 4 is connected to the household-power-line plug socket, this plug unit 4 may receive the commercial AC electric power (power supply voltage), and may transmit/receive signals used for household-power-line communications at the same time. As the filter unit 9 connected to the plug unit 4, the following filter unit having such a filtering characteristic is used. That is, this filter unit may pass therethrough signals having low frequencies such as commercial AC signals, but may not pass therethrough signals having high frequencies such as signals used for household-power-line communications. Also, this filter unit 9 may own such a characteristic capable of not leaking high-frequency noise produced from the power producing unit 7 outside the own filter unit 9. As explained above, since the filter unit 9 is inserted into the AC adaptor integral-type household-power-line coupler, the power producing unit 7 can hardly give adverse influences to the signals used for the

household-power-line communications. The filter unit 9 is constituted of such as choke coil. This power producing unit 7 may produce electric power required in the communication terminal 1 from the commercial AC power filtered by this filter unit 9.

[0047]

Since the AC adaptor integral-type household-power-line coupler of the second embodiment is arranged as explained above, this coupler owns the below-mentioned effects in addition to the effects of the first embodiment mode.

[0048]

(a) Since the filter unit 9 is equipped, the noise produced from the power producing unit 7 which is parallel-connected to the household-power-line coupler 8 may be eliminated by the filter unit 9, and highspeed communications can be carried out between the communication terminal 1 and the household-power-line coupler 8.

[0049]

(b). Since the filter unit 9 may have the high impedance with respect to the high frequency signals used in the household-power-line communications, it is possible to avoid that these high frequency signals flows into the household-power-line power converting/supplying unit 7. As a result, a ratio of signal to noise power can be maintained at a high ratio value, and a highspeed communication can be carried out.

[0050]

(THIRD EMBODIMENT)

Fig. 5 is a block diagram for schematically indicating an AC adaptor integral-type household-power-line coupler of a third embodiment of the present invention. In Fig. 5, reference numeral 10 indicates a signal synthesizing/separating unit that is connected to both the power producing unit 7 and the household-power-line coupler 8.

[0051]

It should be noted that the AC adaptor integral-type household-power-line coupler according to the third embodiment owns such a different technical point that the above-described signal synthesizing/separating unit 10 is added to the AC adaptor integral-type household-power-line coupler according to the second embodiment.

[0052]

Operations of the AC adaptor integral-type household-power-line coupler with employment of the above-described arrangement, according to the third embodiment, will now be explained. While the plug unit 4 is connected to the household-power-line plug socket (not shown), this plug unit 4 may receive the commercial AC electric power (power supply voltage), and may transmit/receive signals used for household-power-line communications at the same time. The filter unit 9 connected to the plug unit 4 owns such a filtering characteristic. That is, this filter unit 9 may pass therethrough signals having low frequencies such as commercial AC signals, but may become a high impedance with respect to signals used for household-power-line communications in a high frequency band,

so that this filter unit 9 may not pass therethrough such high frequency signals. Also, this filter unit 9 may own such a characteristic capable of not leaking high-frequency noise produced from the power producing unit 7 outside the own filter unit 9. As explained above, since the filter unit 9 is inserted into the AC adaptor integral-type household-power-line coupler, the power producing unit 7 can hardly give adverse influences to the signals used for the household-power-line communications.

In this case, the filter unit 9 is constituted by a choke coil, or the like. This power producing unit 7 may produce electric power required in the communication terminal 1 from the commercial AC power filtered by this filter unit 9.

[0053]

Also, the household-power-line coupler 8 that is similarly connected to the plug unit 4 extracts signals used for household-power-line communications from the household power line in a signal reception mode, and superimposes signals on the household power line in a signal transmission mode.

[0054]

The signal synthesizing/separating unit 10 synthesizes a DC voltage supplied from the power producing unit 7 with a high frequency signal derived from the household-power-line coupler 8 while signals are received from the household power line, and then, outputs the synthesized signal to a cable which is connected to another signal synthesizing/separating unit provided on the side of the communication terminal 1. Since the high frequencies of the signals for the household-power-line communications are

different from the DC voltage on the side of the communication terminal 1, the signals can be separated from the DC voltage by the above-explained signal synthesizing/separating unit.

[0055]

In the signal transmission mode, this signal synthesizing/separating unit 10 extracts the high frequency signals used for the household-power-line communication from such a signal derived from the signal synthesizing/separating unit (not shown) provided on the side of the communication terminal 1, and then, supplies this extracted high frequency signal to the household-power-line coupler 8. For example, the signal synthesizing/separating unit 10 employs a choke coil, or the like, while this choke coil may pass therethrough low frequency signals derived from the household power line, but may not pass therethrough high frequency signals such as the signals used for the household-power-line communications.

[0056]

Since the AC adaptor integral-type household-power-line coupler of the third embodiment is arranged as explained above, this coupler owns the below-mentioned effects in addition to the effects of the first and second embodiment modes.

[0057]

The signal synthesizing/separating unit 10 capable of superimposing/separating the high frequency signals derived from the household-power-line coupler 8 on the same cable is held in the internal manner within the casing unit 6 in addition to the power producing unit 7 and the household-power-line coupler

8. As a result, a total number of cables used to connect the AC coupler adaptor internal-type household-power-line coupler to the communication terminal 1 can be reduced to 1, so that the handling characteristic of this coupler can be furthermore improved.

[0058]

(FOURTH EMBODIMENT)

Fig. 6 is a block diagram for schematically indicating an AC adaptor integral-type household-power-line coupler of a fourth embodiment of the present invention. In Fig. 6, reference numeral 11 shows a household-power-line modem which is connected to the household-power-line coupler 8 and is built in the casing unit 6.

[0059]

It should be noted that the AC adaptor integral-type household-power-line coupler according to the fourth embodiment owns such a different technical point that the above-described household-power-line modem 11 is added to the AC adaptor integral-type household-power-line coupler according to the second embodiment.

[0060]

Operations of the AC adaptor integral-type household-power-line coupler with employment of the above described arrangement, according to the fourth embodiment, will now be explained. While the plug unit 4 is connected to the household-power-line plug socket, this plug unit 4 may receive the commercial AC electric power, and may transmit/receive signals

used for household-power-line communications at the same time.

While the household-power-line coupler 8 is connected to the plug unit 4 in parallel to both the power producing unit 7 and the filter unit 9, this household-power-line coupler 8 extracts signals used for household-power-line communications from the household power line in a signal reception mode, and superimposes signals on the household power line in a signal transmission mode. While the household-power-line modem 11 is connected to the household-power-line coupler 8, this household-power-line modem 11 modulates/demodulates signals used for household-power-line communications. The household-power-line modem 11 is connected via a USB cable, or an Ethernet cable to the communication terminal 1. Since the AC adaptor integral-type household-power-line coupler of the fourth embodiment is arranged as above, a total number of such an electronic appliance required in the case that the household-power-line communications are carried out can be reduced to one.

[0061]

Since the AC adaptor integral-type household-power-line coupler of the fourth embodiment is arranged as explained above, this coupler owns the below-mentioned effects in addition to the effects of the first and second embodiment modes.

[0062]

(a) Since the household-power-line modem 11 is equipped into the casing unit 6, there is such an effect that a total number of the electronic appliances required to perform the household-power-line communications can be further reduced.



[0063]

(b) Since the household-power-line coupler 8 and the like may be operated by the electric power supplied from the power producing unit 7 built in the casing unit 6, the circuit arrangement can be made simple, and the AC adaptor integral-type household-power-line coupler can be operated in a higher efficiency.

[0064]

According to this invention described above, the household-power-line power converting/supplying unit (AC adapter) for supplying electric source to be required in communication terminal, and the household-power-line carrier signal coupling unit for using the household-power-line communication are integrated, good handling characteristics, superior appearances and design characteristics can be improved. Also, since filtering unit is inserted when integrating, effects which the household-power-line power converting/supplying unit affect to the household-power-line communication signal can be reduced.

[0065]

According to An AC adaptor integral-type household-power-line coupler described in claim 1, this invention may have the following effects.

[0066]

(a) Since both of the household-power-line power converting/supplying unit and the household-power-line carrier signal coupling unit are contained in the casing unit, it is

possible to collectively handle the both. Thus, it has good handling characteristics.

[0067]

(b) Since the structural arrangement of the peripheral equipment around the communication terminal can be made simpler and compact, resulting in improvements of superior appearances and design characteristics.

[0068]

(C) Since only one set of household-power-line plug socket to be connected is merely required, the communication apparatus can be set in a very easy manner, and the superior maintenance characteristic such as inspections and cleaning of the periphery as to the plug socket can be realized.

[0069]

According to An AC adaptor integral-type household-power-line coupler described in claim 2, this invention may have the following effects.

[0070]

(a) By adding filter unit, it is possible to prevent the noise occurred by the household-power-line power converting/supplying unit from affecting to said household-power-line communication signal, it is possible to carry out to high-speed communication.

[0071]

(b) Since it is possible to prevent high frequency signal using for the household-power-line communication from feeding into the household-power-line power converting/supplying unit,

it is possible to keep the signal-to-noise rate high, it is possible to carry out to high-speed communication.

[0072]

According to An AC adaptor integral-type household-power-line coupler described in claim 3, this invention may have the following effects.

[0073]

In addition to the household-power-line power converting/supplying unit and the household-power-line carrier signal coupling unit, a signal synthesizing/separating unit for superimposing/separating a high frequency signal outputted from said household-power-line carrier signal coupling unit is integrally hold inside the identical casing, accordingly this invention has effects that the number of cable connected between the household-power-line coupler and the communication terminal can be reduced.

[0074]

According to An AC adaptor integral-type household-power-line coupler described in claim 3, this invention may have the following effects.

[0075]

(a) Since the household-power-line modem is equipped into the casing unit, there is such an effect that a total number of the electronic appliances required to perform the household-power-line communications can be further reduced.

[0076]

(b) Since the household-power-line coupler and the like

may be operated by the electric power supplied from the power producing unit 7 built in the casing unit, the circuit arrangement can be made simple, and the AC adaptor integral-type household-power-line coupler can be operated in a higher efficiency.

[0077]

(C) It is possible to simplify circuits to be installed in the communication terminal.

[Brief description of the drawings]

[Fig. 1]

a structural diagram of the conventional household-power-line communication appliance.

[Fig. 2]

a structural diagram for showing a household-power-line communication appliance to which an AC adaptor integral-type household-power-line coupler according to a first embodiment of the present invention is applied.

[Fig. 3]

a block diagram for schematically indicating the AC adaptor integral-type household-power-line coupler of the first embodiment of the present invention.

[Fig. 4]

a block diagram for schematically representing an AC adaptor integral-type household-power-line coupler according to a second embodiment of the present invention.

[Fig. 5]

a block diagram for schematically representing an AC adaptor integral-type household-power-line coupler according to a third embodiment of the present invention.

[Fig. 6]

a block diagram for schematically representing an AC adaptor integral-type household-power-line coupler according to a fourth embodiment of the present invention.

[Description of the Reference Numeral]

- 1 a communication terminal
- 2 AC adapter
- 3 household-power-line coupler
- 4 plug unit
- 5 household-power-line modem
- 6 casing unit
- 7 the household-power-line power converting/supplying unit (power producing unit)
- 8 household-power-line coupler
- 9 filtering unit
- 10 signal synthesizing/separating unit
- 11 household-power-line modem

[Designation of Document]

[ABSTRACT]

[Problem]

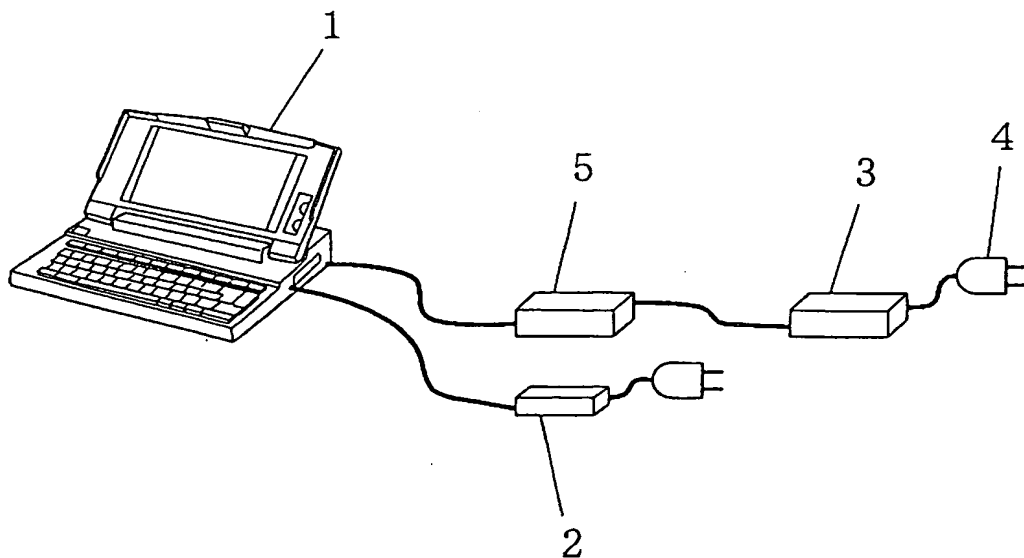
It is to provide a compact AC adaptor integral-type household-power-line coupler capable of simplifying a structural arrangement of an apparatus containing a communication terminal, and also capable of improving a handling characteristic and an outer appearance thereof.

[Means for Resolution]

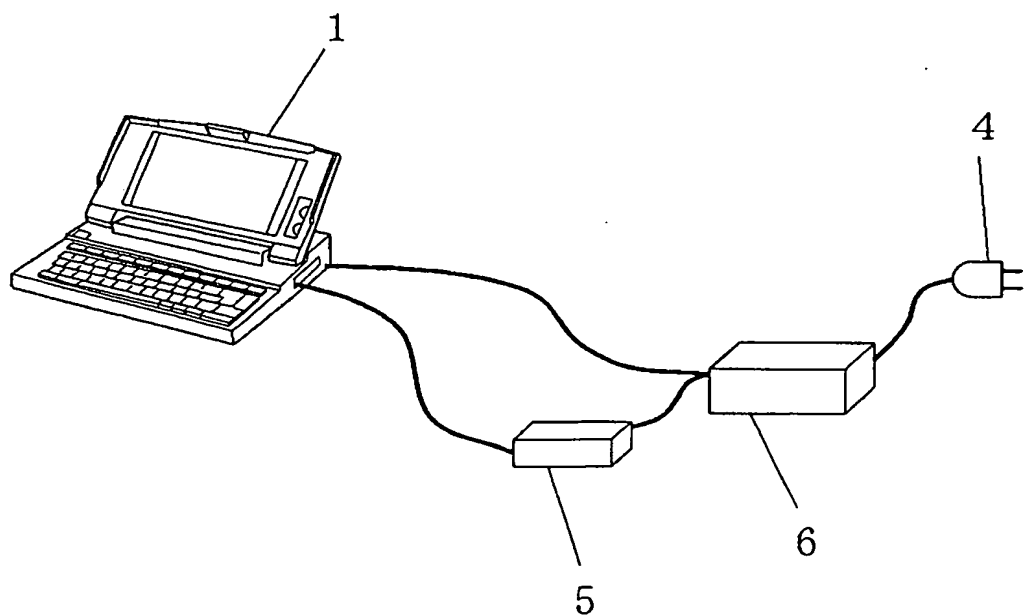
The AC adaptor integral-type household-power-line coupler is arranged by employing a household-power-line power converting/supplying unit 7 connected to a plug unit 4, for supplying electric power to a communication terminal, the plug unit being employed to be coupled to a household-power-line plug socket; a household-power-line carrier signal coupling unit 8 for inputting/outputting a signal via the plug unit 4 to the communication terminal; and a casing unit 6 containing thereinto both the household-power-line power converting/supplying unit 7 and the household-power-line carrier signal coupling unit 8.

[Selected Fig] Fig. 3

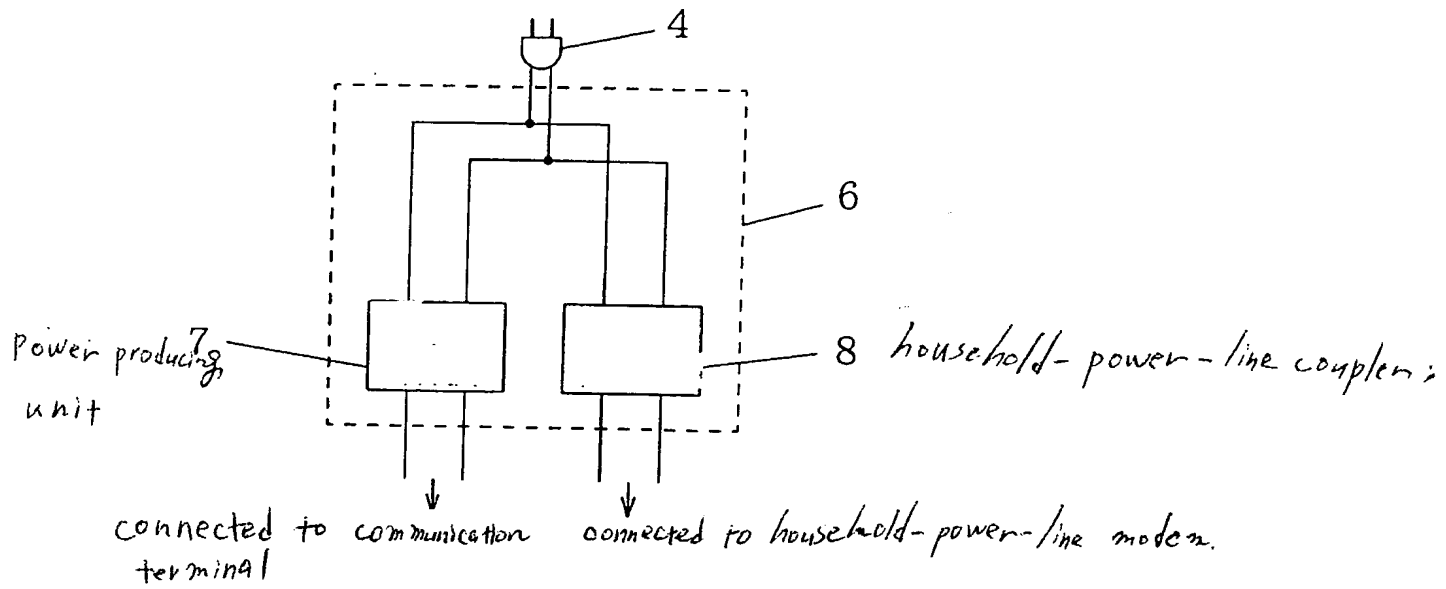
[Fig. 1]



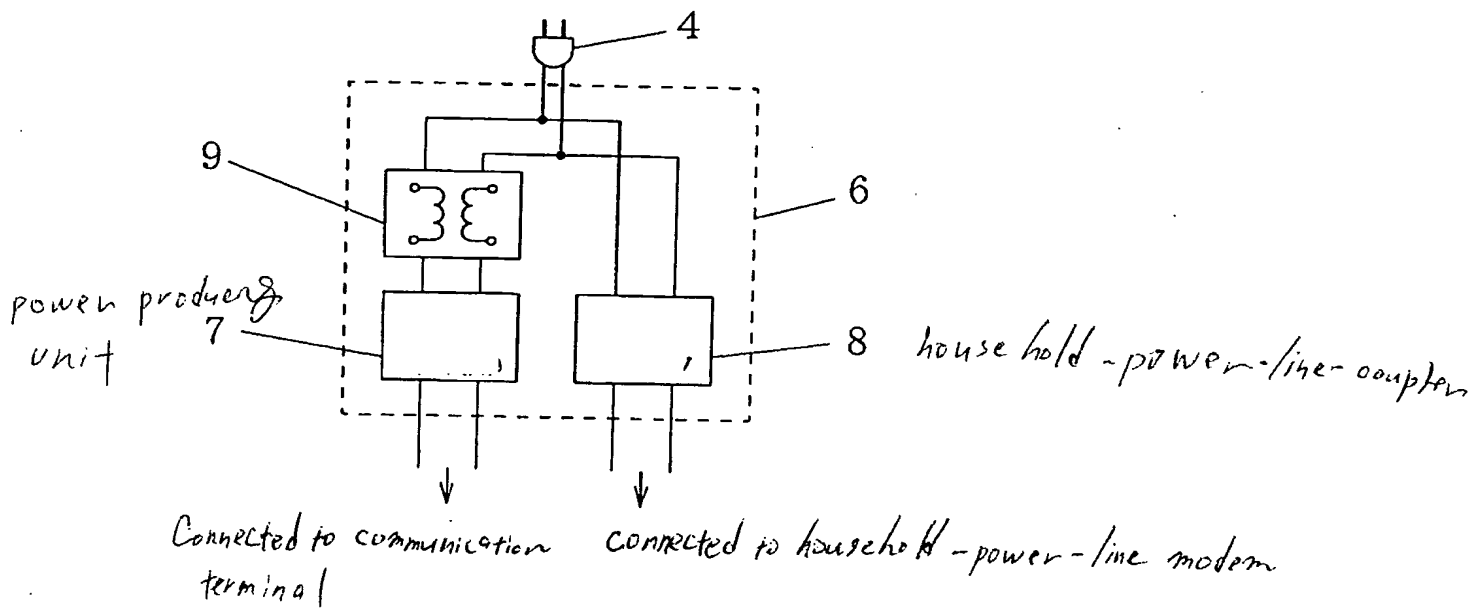
[Fig. 2]



[Fig. 3]

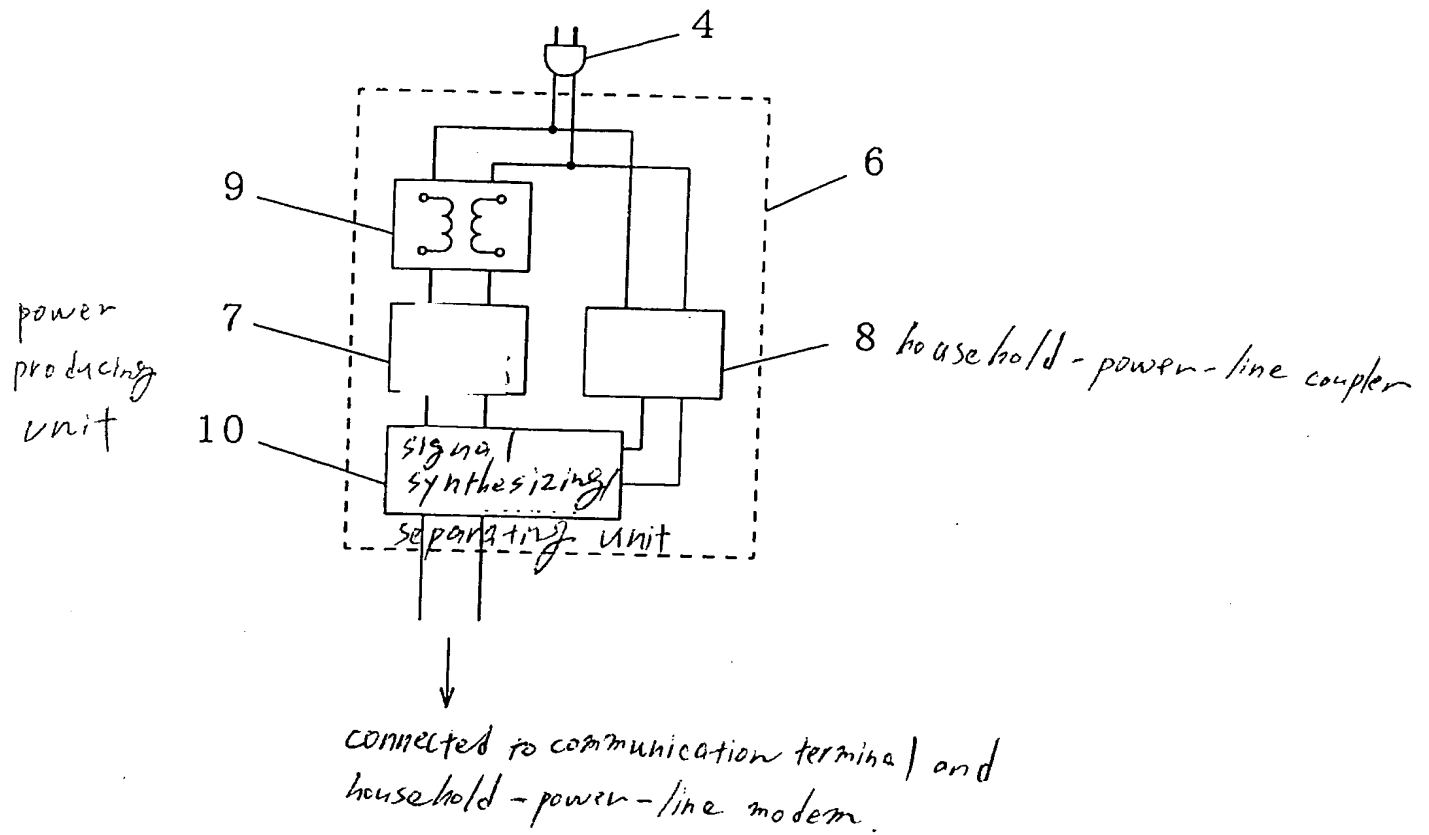


[Fig. 4]

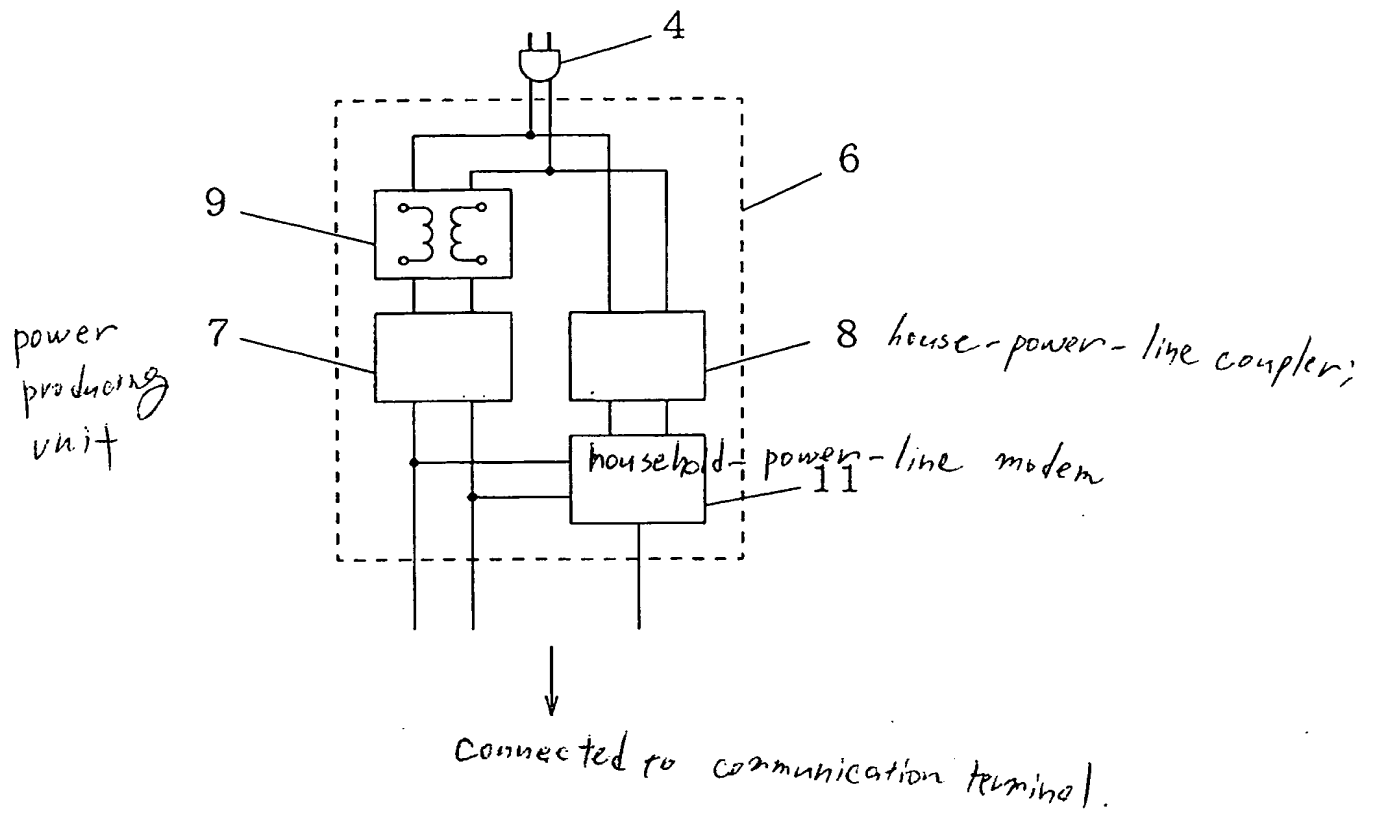




[Fig. 5]



[Fig. 6]





IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of  
Yasuhiro TAMAI, et al.

Serial No.: 10/615,855

Group Art Unit: 2838

Filed: July 9, 2003

Examiner: MATTHEW V NGUYEN

For: AC ADAPTOR INTEGRAL-TYPE HOUSEHOLD-POWER-LINE COUPLER

DECLARATION UNDER 37 CFR 1.55(a)

(Pursuant to 37 CFR 1.68)

Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Satoshi WATANABE, declare and state:

that I am a citizen of Japan, having an Office at P.O. Box  
521, ARK Mori Building 13F, 12-32, Akasaka 1-chome, Minato-ku,  
Tokyo, 107 JAPAN;

that I well understand the Japanese and English languages;

that the attached English-language documents are full, true  
and faithful translations made by me of Japanese Application No.  
2002-200961 filed on July 10, 2002 on which the rights of priority  
under the International Convention are all claimed for the

above-identified application.

I declare further that all statements made herein of my own knowledge are true that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the Application or any patent issuing thereon.

Date: May 9, 2005

Satoshi Watanabe  
Satoshi WATANABE